Transdisciplinary Training Programs:

Key Components and Prerequisites for Success

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Where to target training efforts

Developing researchers

Established researchers…who recognize value

Abrams, 2006; Morgan et al., 2003

Scope of the talk

- Postdoctoral researchers developing into independent investigators in an apprenticeship model of training with a team of mentors.

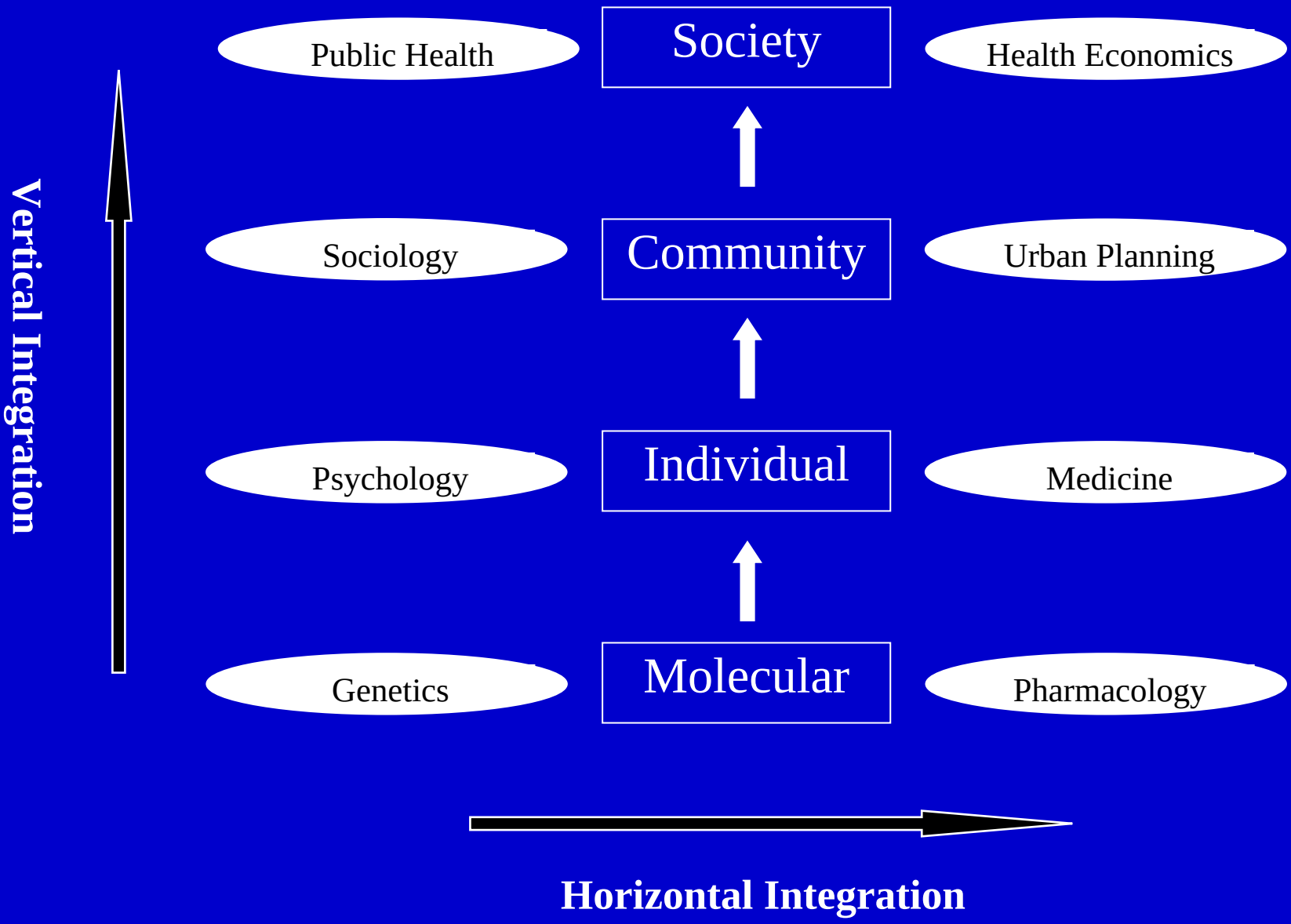
Forms and structures

- Learn a hybrid discipline
  - e.g., genetic epidemiology
- Learn to address a specific problem
  - e.g., cancer prevention
- Address a specific problem within a hybrid discipline

Chang et al., 2005

Forms and structures

- Mentoring
  - Single v. team mentoring
- Integration and scope
  - Vertical v. horizontal integration
  - Broad v. narrow gauged scope


Vertical Integration
Public Health
Society
Health Economics
Sociology
Community
Urban Planning
Psychology
Individual
Medicine
Genetics
Molecular
Pharmacology
Horizontal Integration

Keys to training success

- Develop a unified conceptual understanding
- Understand and overcome the challenges
- Capitalize on known success factors
- Develop evaluation targets, metrics, and measures
- Develop and disseminate training toolkits

Keys to training success

- Key 1
  - Develop a unified conceptual understanding

Integrative Training Approaches

Continuum of Integration

Transdisciplinary Training

Training intended to develop ability to *synthesize* different disciplinary approaches

Interdisciplinary Training

Training intended to develop ability to *use* different disciplinary approaches

Multidisciplinary Training

Training intended to develop ability to work alongside other disciplines

Rosenfield 1992; Rosenfield & Kessel 2003

Keys to training success

- Key 2
  - Develop strategies to confront the challenges in training

Challenges in learning

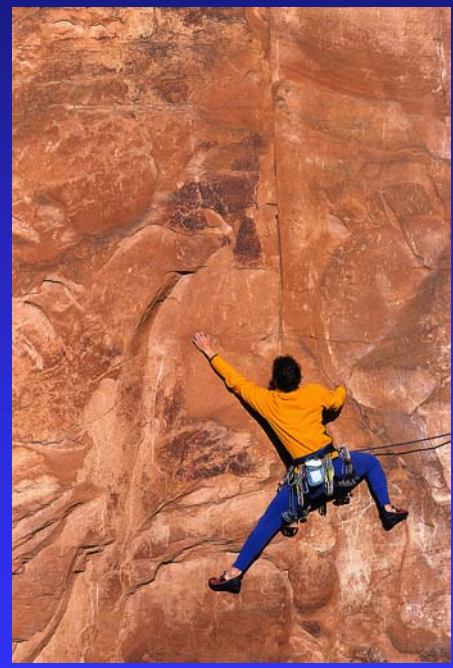
- Need more than expert knowledge and research skills in different disciplines
- Need to be able to shift in and out of disciplines
- Need to learn to live in the divide between disciplines

Challenges in learning styles

- Disciplines use different teaching styles
- Trainees have different learning styles
- Teaching and learning styles interact and do not necessarily match

Challenges in learning languages

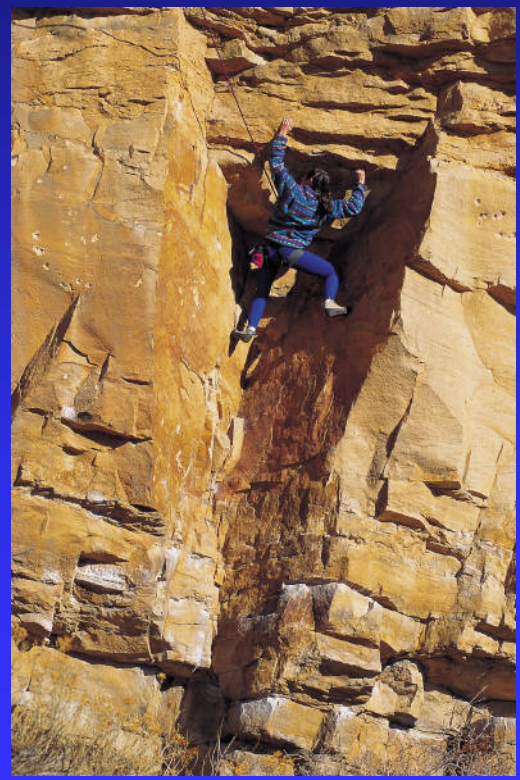
- Training success hinges on capacity to speak different disciplinary languages
- One of the most time consuming, confusing, and frustrating experiences



Kahn & Prager, 1994; Morgan et al., 2003; Rhoten, 2004; Rosenfield & Kessel, 2003; von Ruschkowski, 2003

Challenges in the disciplinary divide

- Between the disciplines is ambiguity and unfamiliarity.
- Constructs are ill-defined, methods not established, and training objectives not clearly specified.
- Mentors can point the way but have not traveled the same path.



Challenges in engaging with unfamiliar others

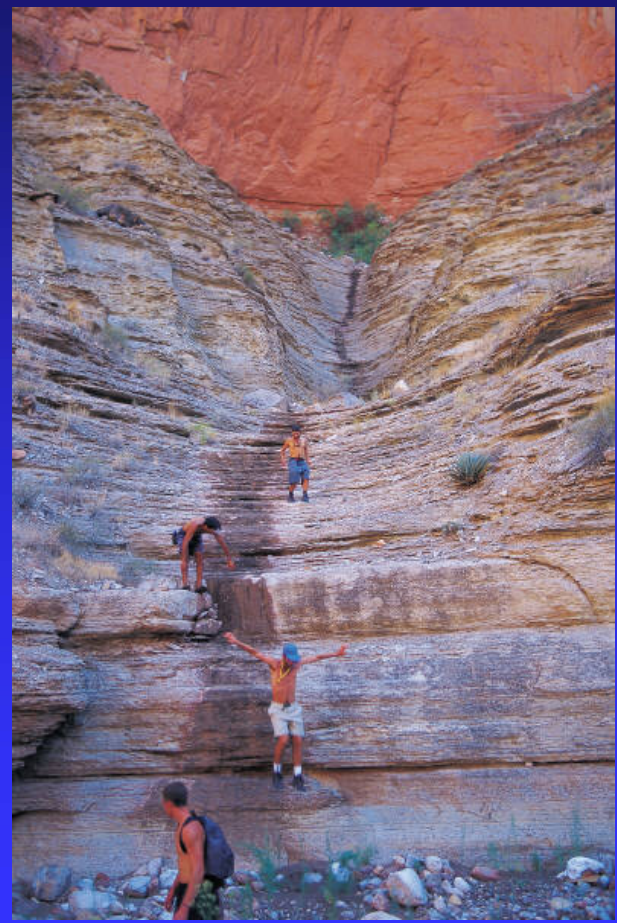
- Overcome the tendency to affiliate with like-minded others
- Overcome the natural tendency for prejudice and to stereotype

Risks in career development and identify confusion

- Employment
- Promotion
- Respect
- Feeling not at home

Challenges in institutional structures

- Traditional academic structures lack readiness to reward and support transdisciplinary training
- Old wine in new bottles



Rhoten & Parker, 2004

Keys to training success

- Key 3
  - Develop strategies and procedures to capitalize on the success factors
    - Antecedent factors
      - Individual and institutional
    - Intervening training processes

Success factors

- Develop training readiness audits to assess for presence of essential transdisciplinary characteristics.

Individual success factors

- Trust
- Communication skills
- Openness and respect
- Contextual thinker
- Interest in multiple methods
- Intellectually curious

Individual success factors

- Tenacious
- Optimistic
- Risk taker
- Tolerance for uncertainty
- Willingly not knowing

Institutional success factors

- Funding dedicated to training...and to the evaluation of training
- Structures
- Leadership

Intervening processes

- Have a defined research problem
- Train about transdisciplinary training
- Plan for serendipity
- Intentionally develop transdisciplinary characteristics in trainees and mentors
- Build in necessary time

Intervening processes

- Have a defined research problem
  - Structures the training and keeps it focused

Intervening processes

- Train about transdisciplinary training
  - Create didactics for trainees to learn about the science of team science, how to operate within and between disciplines, and the career development process.

Intervening processes

- Plan for serendipity
  - Structure the training environment to plan for serendipitous learning, training activities, and projects

Intervening processes

- Develop transdisciplinary characteristics in trainees and mentors
  - Use formal didactics, monitoring, and evaluation methods to ensure development of essential characteristics

Intervening processes

- Plan for adequate time
  - Provide necessary time for overcoming the challenges and learning the transdisciplinary research process

Keys to training success

- Key 4
  - Develop evaluation targets, metrics, and measures

Evaluation

- How integrative is the training?
  - transdisciplinary, interdisciplinary, or multidisciplinary
- What criteria are used to define outcome?
- What timeframe is used for determining effectiveness?

Training structure determines integration

Mentoring structure

Supervised research experiences

Didactic components

Evaluation – outcome criteria

Ultimate outcome is trainees' eventual impact in using integrative theoretical perspectives and methodological approaches to improve the nation's health.

Traditional criteria do not apply

View transdisciplinary qualities of work

Evaluation – transdisciplinary qualities

Hypotheses generated

Number of analytic levels bridged in the study

Use of research methods incorporated from different fields

Co-authored papers with collaborators from different disciplines

Klein, 1996; Mitrany & Stokols, 2004; Stokols, Fuqua et al., 2003; Stokols et al., 2005

Outcomes and Timeline

During Program

Discipline knowledge and skills

Transdisciplinary characteristics

Conference presentations

Publications

Grants proposed

Five-Ten Years Post

Conference presentations

Publications

Grants funded

Ten or More Years

Work cited

Grants funded

Mentoring record

Mentor and Program Effectiveness

Mentor

Transdisciplinary characteristics

Trainee ratings of mentor

Program

Presence of facilitating factors

Track record in producing trainees

Keys to training success

Key 5

Develop and disseminate toolkits for transdisciplinary training

Training toolkits

Audits of training readiness

Methods to develop essential characteristics in trainees and mentors

Strategies to navigate career development challenges

Strategies for shifting in and out of disciplinary frameworks

Methods and measures for evaluation of training